

What is claimed is:

1. A method for controlling a data transmission rate on a reverse link in a mobile communications system having a plurality of base stations and a plurality of mobile stations, the method comprising:

determining an interference level at a base station due to signals from the mobile stations served by the base station;

determining a transmission energy level required for each mobile station;

comparing the interference level with the transmission energy level to obtain a comparison result for each mobile station; and

adjusting a data transmission rate for each mobile station based upon the comparison result sent via a common channel on a forward link to each mobile station in a dedicated manner.

2. The method of claim 1, further comprising a step of generating a rate control bit (RCB) based on the comparison result, the RCB indicating how a current data transmission rate of a respective mobile station is to be adjusted.

3. The method of claim 2, wherein the RCB is inserted into certain bit positions in a channel slot of the common channel.

4. The method of claim 1, wherein the interference level is based on a rise over thermal (ROT) parameter.

5. The method of claim 1, wherein the interference level is based on

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probability of cell interference of each mobile station.

6. The method of claim 1, wherein the transmission energy level is based on a currently assigned data transmission rate.

7. The method of claim 1, wherein the comparing is performed by using a data rate of valid data that can be transmitted in a next frame.

8. The method of claim 1, wherein the comparison result includes a data rate control parameter generated by each base station indicating whether a particular mobile station should increase, decrease or maintain its current data transmission rate.

9. The method of claim 8, wherein each mobile station receives a data rate control parameter from all active base stations to generate a combined data rate control parameter.

10. The method of claim 9, wherein the combined data rate control parameter indicates that a particular mobile station should increase its current data transmission rate if all data rate control parameters received from all active base stations indicate a data transmission rate increase, and that a particular mobile station should decrease its current data transmission rate if at least one data rate control parameter from at least one active base station indicates a

data transmission rate decrease.

11. The method of claim 3, wherein the common channel is newly defined.

12. A method for controlling a data transmission rate on a reverse link in a mobile communications system having a plurality of base stations and a plurality of mobile stations, the method comprising:

determining an interference level of signals received from the mobile stations;

determining a transmission energy level required for each mobile station;

comparing the interference level with the transmission energy level to obtain a comparison result for each mobile station; and

sending the comparison result via a common channel on a forward link to each mobile station in a dedicated manner in accordance with the comparing.

13. The method of claim 12, further comprising a step of generating a rate control bit (RCB) based on the comparison result, the RCB indicating how a current data transmission rate of a respective mobile station is to be adjusted.

14. The method of claim 13, wherein the RCB is inserted into certain bit positions in a channel slot of the common channel.

15. The method of claim 12, wherein the interference level is based on

a rise over thermal (ROT) parameter.

16. The method of claim 12, wherein the interference level is based on a probability of cell interference of each mobile station.

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17. The method of claim 12, wherein the transmission energy level is based on a currently assigned data transmission rate.

18. The method of claim 12, wherein the comparison result includes a data rate control parameter generated by each base station indicating whether a particular mobile station should increase, decrease or maintain its current data transmission rate.

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19. The method of claim 14, wherein the common channel is newly defined.

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20. A method for controlling a data transmission rate on a reverse link in a mobile communications system having a plurality of base stations and a plurality of mobile stations, the method comprising:

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determining a transmission energy level required for transmitting to the base station;

adjusting a data transmission rate based upon a comparison result received from the base station in a dedicated manner via a common channel, the comparison result being obtained by comparing the transmission energy level and an interference level of signals sent to the base station by the mobile

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stations; and

transmitting packet data on the reverse link in accordance with the adjusting.

5           21. The method of claim 20, wherein the interference level is based on a probability of cell interference of each mobile station.

22. The method of claim 20, wherein the comparing is performed by using a data rate of valid data that can be transmitted in a next frame.

10           23. The method of claim 20, wherein each mobile station receives a data rate control parameter from all active base stations to generate a combined data rate control parameter.

15           24. The method of claim 23, wherein the combined data rate control parameter indicates that a particular mobile station should increase its current data transmission rate if all data rate control parameters received from all active base stations indicate a data transmission rate increase, and that a particular mobile station should decrease its current data transmission rate if at least one data rate control parameter from at least one active base station indicates a data transmission rate decrease.

25           25. The method of claim 20, wherein the common channel is newly defined.

26. A base station apparatus in a mobile communications system for controlling a data transmission rate on a reverse link, the apparatus comprising:

a determining means which determines an interference level of signals received from the mobile stations, and determines a transmission energy level required for each mobile station;

a comparing means operatively connected with the determining means, which compares the interference level with the transmission energy level to obtain a comparison result for each mobile station; and

a transceiver operatively connected with the comparing means, which sends the comparison result via a common channel on a forward link to each mobile station in a dedicated manner in accordance with the comparing, and receives packet data on the reverse link in response to the sending.

27. The apparatus of claim 26, wherein the base station further generates a rate control bit (RCB) based on the comparison result, the RCB indicating how a current data transmission rate of a respective mobile station is to be adjusted.

28. The apparatus of claim 27, wherein the base station inserts the RCB into certain bit positions in a channel slot of the common channel.

29. The apparatus of claim 26, wherein the interference level determined by the determining means is based on a rise over thermal (ROT) parameter.

30. The apparatus of claim 26, wherein the interference level determined by the determining means is based on a probability of cell interference of each mobile station.

31. The apparatus of claim 26, wherein the transmission energy level determined by the determining means is based on a currently assigned data transmission rate.

32. The apparatus of claim 26, wherein the comparison result includes a data rate control parameter generated by each base station indicating whether a particular mobile station should increase, decrease or maintain its current data transmission rate.

33. The apparatus of claim 28, wherein the common channel is newly defined.

34. The apparatus of claim 26, wherein the mobile communications system is a next generation code-division multiple access (CDMA) system. (apparatus)

35. A mobile station apparatus in a mobile communications system for controlling a data transmission rate on a reverse link, the apparatus comprising:  
a determining means which determines a transmission energy level required for transmitting to a base station;

an adjusting means operatively connected with the determining means,

which adjusts a data transmission rate based upon a comparison result received from the base station in a dedicated manner via a common channel, the comparison result being obtained by comparing the transmission energy level and an interference level of signals sent to the base station by the mobile

5 stations; and

a transceiver operatively connected with the adjusting means, which transmits packet data on the reverse link in accordance with the adjusted data transmission rate.

10 36. A method for controlling a data transmission rate on a reverse link in a mobile communications system having a plurality of base stations and a plurality of mobile stations, the method comprising:

detecting a total interference amount received by a base station;

15 determining a transmission energy level required by a mobile station based upon a cell interference probability of each mobile station;

receiving transmittable data rate information of each mobile station; and

generating data rate control information in accordance with the total interference amount, the transmission energy level, and the data rate information for controlling a data transmission rate on a reverse link.

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37. The method of claim 36, wherein the base station receives the cell interference probability reported from each mobile station, or calculates the cell interference probability on its own.

25 38. The method of claim 36, further comprising:



preparing, by allocating, a transmission energy required for a data rate  
of a current transmission frame for each mobile station; and

calculating the transmission energy level using the cell interference  
probability applied to the transmission energy required for a data rate of a  
5 current transmission frame for each mobile station.

39. The method of claim 36, wherein the data rate information is set as  
"increase" if a remaining transmission power of each mobile is above a  
threshold, if the number of bits to be sent within a transmission buffer is above a  
10 threshold, and if the data rate of a current transmission is below a maximum  
data rate.

40. The method of claim 36, wherein the data rate information is set as  
"unchanged" if at most, two conditions of a group comprising: if a remaining  
15 transmission power of each mobile is above a threshold, if the number of bits to  
be sent within a transmission buffer is above a threshold, and if the data rate of  
a current transmission is below a maximum data rate, are satisfied.

41. A method for controlling a data transmission rate on a reverse link in  
20 a mobile communications system having a plurality of base stations and a  
plurality of mobile stations, the method comprising:

determining a channel condition value of each mobile station by a pilot  
channel average power level and a data transmission rate;

comparing the channel condition value with a transmission threshold of  
25 a base station calculated by an interference at the base station; and

adjusting a data transmission rate for each mobile station based upon the comparison result sent via a channel on a forward link to each mobile station in a dedicated manner.

5           42. A method for controlling a data transmission rate on a reverse link in a mobile communications system having a plurality of base stations and a plurality of mobile stations, the method comprising:

          determining a total interference level of signals received from one or more mobile stations;

10           determining a data transmission control threshold value according to the total interference level;

          determining a transmission condition value by receiving a reverse link data transmission rate and a transmitted pilot signal strength from the one or more mobile stations;

15           generating reverse link data transmission rate commands by comparing the transmission condition value with the data transmission control threshold value; and

          transmitting data to each mobile station in accordance with the generated reverse link data transmission rate commands.

20           43. The method of claim 42, wherein the data transmission control threshold is either maintained if the total interference level is within a fixed range, increased if the total interference level is less than the fixed range, or decreased the total interference level is greater than the fixed range.

44. The method of claim 42, wherein during the comparison of the transmission condition value, which corresponds to the transmitted pilot signal strength and the reverse link data transmission rate, with the threshold value, a decrease rate bit is formed if the transmission condition value is greater than the threshold value, an increase rate bit is formed if the transmission condition value is smaller than twice the threshold value, and a maintain rate bit is formed for the current data transmission for conditions other than those for forming the decrease rate bit or the increase rate bit.

45. A method for controlling a data transmission rate on a reverse link in a mobile communications system having a plurality of base stations and a plurality of mobile stations, the method comprising:

determining a total interference level of signals received at a base station;

receiving a transmission pilot signal strength and a reverse link data transmission rate from a mobile station; and

generating and sending to the mobile station, a reverse link data transmission rate command using the total interference level, the transmission pilot signal strength, and the a reverse link data transmission rate.